

Special CEPE-Colloquium:

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The Potential to Reduce Information and Communication Technology (ICT) Energy Consumption

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At the hearing "Kyoto and the Internet: The Energy Implications of the Digital Economy" of the US House of Representatives in February 2000, Mark Mills posited that Internet energy use accounted for 8% of total electricity use in the US for 1999 and would rise to 50% of the total in ten years' time. Joseph Romm took the other side in the debate by arguing that the estimates of Internet energy use are greatly exaggerated and that it will even be used in the future to save energy. The U.S. Department of Energy desired a better understanding of current and future commercial office and telecommunications equipment energy consumption and commissioned ADL to do a detailed study. A first report "Energy Consumption by Office and Telecommunications Equipment in Commercial Buildings - Volume I: Energy Consumption Baseline" was published in 2002. Energy savings potential is the subject of the second report and the topic of this special CEPE-Colloquium.

Dr. Roth is an Assistant Principal in the Appliance and Building Technology group of TIAX (formerly Arthur D. Little Technology & Innovation). At TIAX, he leads technology assessment and analysis of energy consumption in buildings, including information and communications technology, building controls and diagnostics, heating, ventilation, and air-conditioning, and appliances. He has published and presented his work in numerous forums. Dr. Roth received his B.S., M.S., and Ph.D. degrees from the Massachusetts Institute of Technology, all in mechanical engineering. He is a member of Sigma Xi, the American Society of Mechanical Engineers, and the American Society of Heating, Refrigeration, and Air-Conditioning Engineers.

Abstract

Over the past ten years, information and communication technology (ICT) has become a significant end use that accounted for at least 3% of U.S. electricity consumption in 2000. In contrast to most energy consumption end uses (such as space heating), ICT has a rapid pace of product evolution and revolution that drives much shorter product lifetimes. This provides the opportunities for rapid improvements in ICT energy consumption from rapid penetration of efficient technologies into the equipment stock. Indeed, large investments in computing and display (monitory) research and development have brought several energy-saving technologies with the potential to significantly reduce ICT energy consumption closer to commercialization. This seminar discusses the energy savings potential of eleven new and emerging ICT technologies and the factors that impact their likelihood of gaining significant market share. Overall, the application of a combination of technologies could reduce the energy consumption of nonresidential PCs, monitors, servers, copy machines, and printers by approximately 70 percent. Since consumers typically purchase office products based on superior performance, innovative features, and cost, and pay little, if any, attention to energy consumption, energy-savings technologies must offer superior performance or identifiable cost savings in order to achieve widespread market adoption.